

is the most expensive of the series, the cost per page is considerably less than that of its predecessors! Having been weaned botanically in the Pacific Northwest and in the institution which might be considered the home of this project I cannot claim to be objective in my assessment of this flora. The superb standards of conception and execution which have characterized this project since its inception have persisted until its completion. The authors deserve our congratulations and warm praise for providing such a durable and scholarly treatment of the vascular plants of the Pacific Northwest.—ROBERT ORNDUFF, University of California, Berkeley.

Supplement to A California Flora. By PHILIP A. MUNZ. iv + 224 pp. University of California Press, Berkeley and Los Angeles. 1968. \$7.00.

The appearance of a 224-page supplement to a flora of California is an event of interest to all botanists interested in the plants of North America. The size of the supplement attests to the amount of work that has been done on the plants of the state in the decade since the publication of the original work. On the other hand, this very size likewise makes the use of the supplement inconvenient. One wishes that a new edition of the Flora could have been prepared instead, but since that was apparently not possible, the supplement is a welcome substitute.

Most of the material in the supplement has to do with changes proposed in revisions and other monographic works that have appeared since 1959. Unfortunately, as in the original Flora, bibliographical citations are abbreviated to the point where they are of limited value. Thus the name of a worker may refer to a publication, a personal communication, or even a specimen, and the status of the date which sometimes follows the name is of comparably uncertain origin. There is no printed bibliography, and the reader will often not be able to distinguish the possibilities given above. On the other hand, the addition of a bibliography would have made the Supplement even longer, and, for those with a thorough working knowledge of the California flora, the brief references given here will be of some use in indicating the sources of the statements given.

In addition, range extensions, new chromosome numbers, and other new information is given for hundreds of species. The format is convenient and the information presented is easily integrated with that in the flora, and the supplement itself is nearly free of typographical errors. There is a useful index, and the sturdy, attractive volume is well printed and bound.

In connection with the supplement, it is of interest to draw attention to two articles that provided statistical analyses of the material in the original book: Smith, Gladys L. and Anita M. Noldeke, "A statistical report on A California Flora," *Leafl. West. Bot.* 9: 117-123. 1960., and Noldeke, Anita M. and J. T. Howell, "Endemism and A California Flora," *Leafl. West. Bot.* 9: 124-127. 1960. These papers reveal that 162 families, 1075 genera, 5675 species, 1586 additional subspecies and varieties, and 443 taxa of indefinite status were reported in the Flora, with the largest families being Compositae (822 species), Gramineae (449 species), and Leguminosae (372 species), and the largest genera being *Carex* (144 species), *Astragalus* (93 species), *Phacelia* (87 species), *Lupinus* (82 species), and *Eriogonum* and *Mimulus* (77 species each).

Nearly 30 per cent of the native species were endemic to California, as compared with about 40 per cent reported by W. L. Jepson in his (1925) *Manual of the Flowering Plants of California*. The reduction appears to be due largely to the successful abandonment of Jepson's highly provincial view of the plants of California, as well as to extensive and intensive exploration just beyond the borders of the State, especially in Baja California and Oregon. Nevertheless, California still has an extraordinarily high proportion of endemics for a continental area, and were the proportion of endemism computed for the entire "California floristic province," which excludes the desert areas of California but includes portions of the three neighboring states, the proportion would be much higher.

As the number of naturalized species represented in the flora of California creeps inexorably upward, dozens of recently reported genera, including for example *Pteris*, *Cyrtomium*, *Viscum*, *Gunnera*, *Rhagadiolus*, *Boussingaultia*, *Halodule*, and *Apera*, are listed in this Supplement, as is the family Aponogetonaceae. It is becoming increasingly obvious that if future works are to provide a balanced account of the plants of the State, that we shall have to reexamine our standards for inclusion or exclusion of weedy plants; old records of species that did not persist, for example, should presumably not continue to be listed.

In the Supplement, the family Balsaminaceae is reported from California for the first time, on the basis of a native and an introduced species; the same appears to be true for Loganiaceae, as *Buddleia utahensis* Cov. was accidentally omitted from the Flora itself. The Koeberliniaceae are likewise added to the flora of the State on the basis of a recently published record of *Koeberlinia spinosa* Zucc. in the Chocolate Mts. of Imperial County. *Kobresia* and *Bensoniella* (*Bensonia*) are recently reported genera of native plants, and outstanding native species added to the flora of the State during the past decade include *Lycopodium inundatum* L., *Abies amabilis* (Dougl.) Forbes, *Saxifraga caespitosa* L., *Rubus nivalis* Dougl., and *Juncus marginatus* Rostk. Thus as in recent decades, nearly all of the additions to the flora of the State come from the geologically complex and floristically rich ranges of northern California, and, to a lesser extent, from the Sierra Nevada. This strongly suggests that the flora of central and southern California is relatively well known.

Floristic work among the plants of California, in part spurred by the appearance of the Flora, has been extensive, with genera such as *Streptanthus* and *Galium* continuing to receive a great deal of attention, and critical recently described species being listed in such genera as *Polystichum*, *Silene*, *Opuntia*, *Monardella*, and *Nemacladus*. Recent generic segregates such as *Calocedrus*, *Chrysolepis*, and *Munzothamnus* are recognized in the Supplement. A few new combinations, new varieties, and at least one new species (*Lavia ziegleri* Munz) are presented in the work itself.

An entirely new treatment of the genus *Eriogonum*, based on notes by James L. Reveal, is incorporated directly into the Supplement. This 40-page synopsis indicates that 104 species are now known from the State, in comparison with the 77 listed in the Flora. The new treatment is an excellent contribution which should greatly aid students of the genus, and incorporates much new information. It is much more monographic in scope than most of the Flora, containing numerous critical notes. As such, the work on *Eriogonum* stand in sharp contrast, for example, to the scattered notes on *Arctostaphylos* summarized here. In the latter group, a variety of workers have continued to present new combinations and new taxa without ever approaching the overall view of the group necessary to achieve taxonomic synthesis. A useful taxonomic system for a complex group such as *Arctostaphylos* will never be built up of such blocks, and indeed, the overall pattern of variation tends to become more and more obscure as the new taxa are proliferated. It is greatly to be hoped that some of the studies of this genus now under progress will eventually provide a new synthesis, based on a sound understanding of the biology of the plants, that will make possible an appreciation of this most critical and interesting genus, whose history is inextricably bound up with that of the floristic associations with which it occurs.—PETER H. RAVEN, Department of Biological Sciences, Stanford University.